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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Pneumatic Tire with Grey Colored Sidewall

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Abstract of the Disclosure

PNEUMATIC TIRE WITH GREY COLORED SIDEWALL

5 A pneumatic rubber tire having at least one
sidewall composed of carbon black reinforced rubber
and containing at least one integral, visible grey
colored rubber component. In one aspect, the grey
colored component may be an annular band or a raised
10 identification.

PNEUMATIC TIRE WITH GREY COLORED SIDEWALL

Field

5 This invention relates to a tire with a sidewall with at least a portion thereof having a color contrasting with the color of the tire. The invention particularly relates to a tire with a grey colored sidewall component.

10 Background

Pneumatic rubber tires containing carbon black reinforcement are often prepared with a portion of at least one sidewall having a color which contrasts to the color of the remainder of the tire. While various
15 colors might be considered, usually the contrasting color is white.

In particular, such a pneumatic rubber tire is often prepared with a white sidewall which is usually a black sidewall having, as a component thereof, an
20 annular white rubber band or white colored raised letters embedded therein.

For the white sidewall, or raised white letters or other identification, the rubber is typically compounded with a white-colored pigment such as, for
25 example, titanium dioxide. Carbon black is not normally used in the white sidewall because even very small amounts would discolor the white sidewall rubber.

It is appreciated that the titanium dioxide coloring pigment is not considered to be a rubber
30 reinforcing ingredient for rubber but is more in a form of a filler.

In contrast, the typically unwanted carbon black is well recognized as being a reinforcing ingredient
35 for rubber, and not simply just a filler pigment or material.

Disclosure and Practice of the Invention

In accordance with this invention, a pneumatic rubber tire is provided which is comprised of a tread, two spaced beads, and two sidewall elements extending
5 between said tread and bead elements, and a fabric reinforced carcass supporting said tread and sidewall, wherein said tread and sidewalls are composed of carbon black reinforced rubber, an improvement characterized in that at least one of said sidewalls
10 containing at least one integral, visible grey colored rubber component, wherein said rubber component is a sulfur cured rubber containing as basic colorants, based on 100 parts by weight rubber, about 1 to about 3 parts by weight carbon black pigment about 4 to
15 about 8 parts by weight titanium dioxide, where the weight ratio of carbon black to titanium dioxide is in a range of about 1:8 to about 3:4.

The carbon black reinforced rubber sidewall is considered to be black in color.
20 Such colorants are referred to as basic colorants since it is considered that the color of the sidewall band is derived primarily from such colorants and, thus, dominate its visible color, although it is recognized that it is likely that the rubber itself
25 and other compounding ingredients contained in the rubber may contribute to its color in a minor way.

In one aspect, the said grey colored component is an annular rubber band.

In another aspect, the said grey colored
30 component is composed of raised identifying characters, where said characters may consist of letter, numbers and/or insignia.

It is to be appreciated that the color of the aforesaid cured grey rubber component contained in the
35 sidewall portion of the tire, absent the titanium dioxide, would typically be black.

By inclusion of titanium dioxide, a grey-colored sidewall band is provided which has a pleasing effect. It is also perceived that the basic carbon black contributes reinforcement to the grey sidewall rubber which would not be present in a white sidewall rubber containing titanium dioxide in the absence of carbon black.

The presence of carbon black is considered of interest because of the rubber reinforcement quality of carbon black, and such reinforcement effect would be considered to be important since, significantly, a grey color is imparted to the sidewall rubber as being of good stability because of the resistance of the carbon black to migrate within the cured rubber composition.

This is considered to be a particularly significant quality of the carbon black as a colorant.

It is, thus, considered significant that the grey color is apparently primarily obtained with pigments instead of oil-based dyes, because the dyes would be expected to migrate to the rubber surface and diminish their colorant effect over time. Therefore, it is anticipated that the utilization of the reinforcement type of carbon black adds a degree of stability to the colorant effect for the sulfur cured sidewall rubber.

Contemplated benefits of the carbon black reinforcement and titanium dioxide reduction for a grey colored rubber (e.g. grey colored tire sidewall) which would otherwise be a white colored rubber with increased titanium dioxide and no carbon black are reduced weight because of a lower specific gravity which is considered to be an advantage for cost and rolling resistance due to its somewhat lighter weight; a durability improvement in tear separation resistance as would be expected to be evidenced by reductions in curb scuffing and impact separations.

The aforesaid expected durability improvement is considered to be due primarily to the carbon black reinforcement aspect of the grey colored rubber, particularly when used as a tire sidewall portion.

5 This is considered significant as compared to utilization of a titanium dioxide colored (in absence of carbon black) tire sidewall.

The utilization of the prescribed grey colored sidewall component is also considered to be useful in providing unique styling distinctness to the tire as compared to tires without such a sidewall components.

10 In one aspect, or embodiment, of the invention, a black colored pneumatic tire is provided which has at least one sidewall containing at least one annular groove and at least one annular rib where at least one groove and/or at least one rib constitutes said annular, contrastingly grey colored rubber band.

15 The said contrastingly grey colored rubber component is considered as being integral with the tire sidewall where both it and the remainder of the tire sidewall are each compounded with sulfur curative and co-cured together.

20 Typically, such sidewall component, particularly an annular, grey colored rubber sidewall band, or raised identification, is comprised of at least one rubber selected from natural rubber and halobutyl rubber may contain EPDM rubber and/or styrene/butadiene copolymer rubber.

25 As an example, such rubber component may be comprised of a mixture of natural rubber and halobutyl rubber or a mixture of natural rubber, halobutyl rubber and EPDM rubber. Such sidewall rubber mixtures are well known rubber blends often be used for white sidewall mixtures. (For example, see the Vanderbilt Rubber Handbook (1978), page 65, "Passenger Tire Sidewalls-White").

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Preferably, the halobutyl rubber is selected from at least one of chlorobutyl rubber and bromobutyl rubber. EPDM rubber is an ethylene/propylene/non-conjugated diene terpolymer rubber. Such
5 terpolymer rubbers are well-known.

The following example is intended to exemplify features of the invention. The parts and percentages are by weight unless otherwise indicated.

10

EXAMPLE I

Two sidewall type samples were prepared and cured to which titanium dioxide had been added. The are referred to herein as Exp. A and Exp. B. Their
15 compositions comprised the materials shown in Table 1.

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| <u>Table 1</u> | | |
|----------------|--------------------------------------------------|--------------------------------------------------|
| | <u>Parts by</u> <u>Weight</u> <u>Exp A</u> | <u>Parts by</u> <u>Weight</u> <u>Exp B</u> |
| 5 | <u>Ingredients</u> | |
| | Chlorobutyl rubber | 60 |
| | Natural rubber | 35 |
| | EPDM rubber ¹ | 5 |
| | Titanium dioxide | 4 |
| 10 | Phenolic antidegradant ² | 1 |
| | Sulfenamide type accelerator | 1.75 |
| | Sulfur | 1.2 |
| | Zinc oxide | 5 |
| 15 | Stearic acid | 1 |
| | Carbon black (N-660) ³ | 3 |
| | Napthenic/paraffinic oil | 4 |
| | Kaolin clay | 20 |
| | Phenolformaldehyde resin | 1.5 |
| 20 | Hard clay | 35 |

1. EPDM rubber, an ethylene/propylene/non-conjugated diene terpolymer rubber.
2. Polymeric hindered phenol type.

3. An N-660 carbon black reported as having an iodine absorption number of 36 and a DBP (dibutyl phthalate) value of 90.

5 The Exp. A and Exp. B cured rubbers had a visibly medium grey color.

Such compounded rubber is extruded to form an extruded rubber strip following which it is built into a tire on what is to become its sidewall and to become an annular grey colored band or raised letters therein and the resulting tire assembly shaped and cured in a suitable mold at an elevated pressure and temperature condition.

10 The rubbers had physical properties as shown in the following Table 2.

| <u>Table 2</u> | | |
|---------------------|--------------|--------------|
| <u>Property</u> | <u>Exp A</u> | <u>Exp B</u> |
| Modulus, 300% (MPa) | 3.3 | 3.4 |
| 20 Elongation (%) | 520 | 540 |
| Rebound at 23°C | 36 | 35 |
| Rebound at 100°C | 61 | 61 |

25 The presence of the carbon black is considered to add a reinforcement effect to the titanium dioxide pigment containing rubber.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in this art that various changes and modifications may be made therein without departing from the spirit or scope of the invention.

WHAT IS CLAIMED IS:

1. A pneumatic rubber tire composed of a tread,
two spaced beads, and two sidewall elements extending
5 between said tread and bead elements, and a fabric
reinforced rubber carcass supporting said tread and
sidewalls, wherein said tread and sidewalls are
comprised of carbon black reinforced rubber, an
improvement characterized in that at least one of said
10 sidewalls contains at least one integral, visible grey
colored rubber component, wherein said rubber
component is a sulfur cured rubber containing as basic
colorants, based on 100 parts by weight of said
rubber, about 1 to about 3 parts by weight carbon
15 black and about 4 to about 8 parts by weight titanium
dioxide pigment, wherein the weight ratio of carbon
black to titanium dioxide is in a range of about 1:8
to about 3:4.

20 2. The tire of claim 1 wherein the rubber for
said grey colored rubber component is selected from at
least one of natural rubber, halobutyl rubber and EPDM
rubber and may contain styrene/butadiene copolymer
rubber.

25 3. The tire of claim 1, where said carbon black
is an N-660 carbon black having an iodine number in
the range of about 31 to about 41 and a DBP number in
the range of about 85 to about 95.

30 4. The tire of claim 1 where said grey colored
rubber sidewall component is an annular band.

35 5. The tire of claim 1 where said grey colored
rubber sidewall component is a raised identification.